

Name: Solutions

Without a calculator, use the properties of logarithms to EXPAND the following expressions:

1. $\log_b(8k) = \log_b 8 + \log_b k$	2. $\log\left(\frac{n}{m}\right) = \log n - \log m$
3. $\log_5(x^3 \cdot y) = \log_5 x^3 + \log_5 y$ $=$	4. $\log_3\left(\frac{xy}{h^2}\right) = \log_3(xy) - \log_3 h^2$ $= \log_3 x + \log_3 y - 2\log_3 h$

Without a calculator, use the properties of logarithms to CONDENSE the following expressions:

5. $\log_2 a - \log_2 b = \log_2\left(\frac{a}{b}\right)$	6. $\log_b x^5 = 5\log_b x$
7. $2\log w = \log(w^2)$	8. $\frac{\log k}{2} = \frac{1}{2}\log k = \log k^{\frac{1}{2}} = \log \sqrt{k}$
9. $4\log_k c - x\log_k 6 = \log_k c^4 - \log_k 6^x$ $\log_k(c^4 \cdot 6^x)$	10. $a\log_7 5 + 3\log_7 y = \log_7(5^a) + \log_7(y^3)$ $= \log_7(5^a y^3)$

Use the properties of logarithms to evaluate each expression:

11. $\log_5 100 - \log_5 4 = \log_5\left(\frac{100}{4}\right)$ $= \log_5 25 = 2$	12. $\log_3 2 + \log_3 13.5 = \log_3((2)(13.5))$ $= \log_3 27 = 3$
13. $2\log_{10} 2 + \log_{10} 25 = \log_{10} 2^2 + \log_{10} 25$ $= \log_{10} 4 + \log_{10} 25 = \log_{10} 100 = 2$	14. $2\log_6 3 + 2\log_6 2 = \log_6 9 + \log_6 4$ $= \log_6(36) = 2$
15. $\log_2 \sqrt{2} + \log_2 \sqrt{32} = \log_2 \sqrt{64}$ $= \log_2 8 = 3$	16. $\log_3 900 - 2\log_3 10 = \log_3 900 - \log_3 100$ $\log_3 9 = 2$